

REMARKS

Claims 8 and 11 are canceled (claims 2, 16 and 19 were previously canceled). Claims 1, 10, 14, 15 and 20 have been amended. Claims 1, 3-7, 9-10, 11-15, 17-18 and 20 remain in the application. Support for the amendments to the claims is identified herein. No new matter has been added. Reconsideration and allowance of the application is respectfully requested.

Rejection under 35 U.S.C. §103

Claim 1 recites an X-ray source comprising:

- an electron source for emission of electrons in an electron beam,
- a target for emission of characteristic, substantially monochromatic X-rays in response to incidence of the electrons of the electron beam onto said target, said target comprising a metal foil of a thickness of between one and three μm and a base arrangement for carrying said metal foil, wherein the metal of said metal foil has a high atomic number allowing the generation of high intensity bremsstrahlung X-rays in a direction of transmission of the electron beam and generation of low intensity bremsstrahlung X-rays in a direction of reflection from said target and the material substantially included in the base arrangement has a low atomic number not allowing the generation of X-rays, and

- an outcoupling means, which generally only transmits X-rays propagating in the reflection direction of the metal foil over an angular range of $\pm 20^\circ$ antiparallel to the incident direction of the electron beam, for outcoupling a background of the low-intensity bremsstrahlung X-rays on which quasi-monochromatic characteristic lines of the metal foil are superimposed resulting in a quasi-monochromatic spectrum of X-rays on the side of the metal foil on which the electrons are incident and which is opposite to the side of the base arrangement, wherein said base arrangement comprises a rotatable base plate of a material having an atomic number of less than 10.

Support for the amendment to claim 1 (as well as for amendment to claims 14 and 15) can be found in the specification on at least page 2, line 13; page 6, line 23 and

29-34; page 7, lines 1-9; and page 8, lines 14-19 of the application as originally filed. In addition, support for the amendment to claim 10 can be found in claim 10 as was originally filed. Support for the amendment to claim 20 can be found in the specification on page 8, lines 14-19.

Claims 1, 3-15, 17 and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Whitaker (US 4,622,687) in view of Arndt (US 6,282,263 B1). With respect to claims 8 and 11, the same have been canceled herein, thus rendering the rejection thereof now moot. With respect to claim 1, Applicant traverses this rejection on the grounds that these references are defective in establishing a prima facie case of obviousness.

As the PTO recognizes in MPEP § 2142:

... The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness...

It is submitted that, in the present case, the office action has not factually supported a prima facie case of obviousness for the following, mutually exclusive, reasons.

1. Even When Combined, the References Do Not Teach the Claimed Subject Matter

The Whitaker and Arndt patents cannot be applied to reject claim 1 under 35 U.S.C. § 103 which provides that:

A patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains ... (Emphasis

added)

Thus, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, since neither Whitaker nor Arndt teaches "... a target ... comprising a metal foil of a thickness of between *one and three μm* ... wherein the metal ... allowing the generation of *high intensity bremsstrahlung X-rays* in a direction of *transmission* of the electron beam and generation of *low intensity bremsstrahlung X-rays* in a direction of *reflection* from said target ... and an outcoupling means ... transmits X-rays propagating in the reflection direction of the metal foil over an *angular range of $\pm 20^\circ$ antiparallel* to the *incident direction* of the electron beam, for outcoupling a *background* of the *low-intensity bremsstrahlung X-rays* on which quasi-monochromatic characteristic lines of the metal foil are superimposed resulting in a *quasi-monochromatic spectrum of X-rays* ..." as is claimed in claim 1, it is impossible to render the subject matter of claim 1 as a whole obvious, and the explicit terms of the statute cannot be met.

In contrast, it is noted that Whitaker discloses a liquid cooled anode X-ray tube, in which reference numerals 149 and 151 of FIG. 15 are directed to electron focal tracks. However, the term "track" as is best understood from the specification of Whitaker Col. 1, lines 45-60, refers to an "irradiated portion of the anode." No reference could be found in Whitaker that a "metal foil" is disposed on the anode. Accordingly, Whitaker does not disclose "... a target ... comprising a metal foil of a thickness of between *one and three μm* ..." as is required in claim 1.

Thus, for this mutually exclusive reason, the burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103 should be withdrawn.

2. The Combination of References is Improper

Assuming, arguendo, that the above arguments for non-obviousness do not apply (which is clearly not the case based on the above), there is still another, mutually exclusive, and compelling reason why the Whitaker and Cline patents cannot be applied to reject claim 1 under 35 U.S.C. § 103.

§ 2142 of the MPEP also provides:

...the examiner must step backward in time and into the shoes worn by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made.....The examiner must put aside knowledge of the applicant's disclosure, refrain from using hindsight, and consider the subject matter claimed 'as a whole'.

Here, neither Whitaker nor Arndt teaches, or even suggests, the desirability of the combination since neither teaches the specific implementation of "... a target ... comprising a metal foil of a thickness of between *one and three μm* ... wherein the metal ... allowing the generation of *high intensity bremsstrahlung X-rays* in a direction of *transmission* of the electron beam and generation of *low intensity bremsstrahlung X-rays* in a direction of *reflection* from said target ... and an outcoupling means ... transmits X-rays propagating in the reflection direction of the metal foil over an *angular range of $\pm 20^\circ$ antiparallel* to the *incident direction* of the electron beam, for outcoupling a *background* of the *low-intensity bremsstrahlung X-rays* on which quasi-monochromatic characteristic lines of the metal foil are superimposed resulting in a *quasi-monochromatic spectrum of X-rays* ..." as specified above and as claimed in claim 1.

Thus, it is clear that neither patent provides any incentive or motivation supporting the desirability of the combination. Therefore, there is simply no basis in the art for combining the references to support a 35 U.S.C. § 103 rejection.

In this context, the MPEP further provides at § 2143.01:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.

In the above context, the courts have repeatedly held that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination.

In the present case it is clear that the alleged combination arises solely from hindsight based on the invention without any showing, suggestion, incentive or motivation in either reference for the combination as applied to claim 1. Therefore, for this mutually exclusive reason, the burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103 should be withdrawn. Accordingly, claim 1 is allowable and an early formal notice thereof is requested.

With respect to claims 3-7, 9, 10, 12 and 13, the same depend from and further limit, in a patentable sense, allowable independent claim 1 and thus are allowable as well. Withdrawal of the rejection is respectfully requested.

With respect to claim 14, the same has been amended in a manner similar to the amendment to claim 1. Claim 14 is thus believed allowable over Whitaker in view of Arndt for at least similar reasons. Withdrawal of the rejection is respectfully requested.

With respect to claim 15, the same has been amended in a manner similar to the amendment to claim 1. Claim 15 is thus believed allowable over Whitaker in view of

Arndt for at least similar reasons. Withdrawal of the rejection is respectfully requested.

With respect to claims 17 and 18, the same depend from and further limit, in a patentable sense, allowable independent claim 15 and thus are allowable as well.

Withdrawal of the rejection is respectfully requested.

Claim 20 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Whitaker in view of Arndt, further in view of Wilson (US 6,947,522). With respect to claim 20, the same depends from and further limits, in a patentable sense, allowable independent claim 1 and thus allowable as well. Withdrawal of the rejection is respectfully requested.

Conclusion

Except as indicated herein, the claims were not amended in order to address issues of patentability and Applicants respectfully reserve all rights they may have under the Doctrine of Equivalents. Applicants furthermore reserve their right to reintroduce subject matter deleted herein at a later time during the prosecution of this application or a continuation application.

It is clear from all of the foregoing that independent claims 1, 14 and 15 are in condition for allowance. Dependent claims 3-7, 9, 10, 12 and 13 depend from allowable independent claim 1, and are thus also allowable. Dependent claims 17 and 18 depend from allowable independent claim 15 and are thus also allowable.

Amendments herein are fully supported by the original specification and drawings as discussed herein; therefore, no new matter is introduced. Issuance of an early formal notice of allowance of claims 1, 3-7, 9-10, 11-15, 17-18 and 20 is requested.

Respectfully submitted,

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